

REMARKS

This is a response to the Office Action mailed November 16, 2004. Claims 1, 4-8, 10-19, and 21-49 will be pending upon entry of the present amendment. Claim 16 is amended. Claims 6-8, 10-15, 17-19, 21-23, 27, 31-33, and 36-41 are currently withdrawn from further consideration as being drawn on a non-elected species, pending allowance of a generic claim.

Amendments to the specification

The amendments to the specification are provided to correct minor typographical errors and to update information on pending applications incorporated by reference.

Rejections Under 35 U.S.C. §103

Claims 1, 4, 5, and 16 are rejected under 35 U.S.C. §103(a) as being unpatentable over Cozad et al. (U.S. Patent 6,160,243) in view of McSparran et al. (4,996,487).

Applicant disagrees that a combination of Cozad and McSparran teaches or suggests the limitations of claim 1. Claim 1 recites, in part, “at least one transistor ... operable to *generate heat above a selected threshold*; ... and a fluid to be heated positioned within the fluid retaining chamber and adjacent to the transistor to receive the *heat generated by the transistor*.” Applicants agree with the Examiner’s statement that Cozad does not teach a heat-generating transistor formed in the semiconductor material. Further, McSparran fails to disclose such a transistor. The Examiner observes that McSparran “teaches an integral heater having a transistor 32a with a heater 20a” However, applicant notes that it is McSparran’s electrical resistance heating element 20a that actually generates the heat employed to cause a gas bubble to form, rather than a transistor, as recited in claim 1 (see column 3, lines 23-26). An examination of McSparran’s Figure 1 shows the resistive heating element 20 connected between electrodes 22. Clearly, the element 20 is not a transistor. The transistors 32a-n are for control of the respective heating elements. McSparran is silent with respect to heat generating transistors.

Furthermore, there is no indication that McSparran’s transistors 32a-n are even formed on the same substrate as the heater, as suggested by the Examiner. Figure 1 shows only the heater 20 formed on the substrate 14, receiving power through the electrodes 22. There is no

indication that any transistor is formed therewith. The remaining figures are circuit diagrams, which provide no teaching as to the formation of the components symbolized. Nor does the text provide such a teaching, indicating only that the heater 20 is formed on the substrate 14 (column 3, lines 13-15). Applicant stresses that even if the transistors 32 were shown to be formed on the substrate, McSparran would still fail to remedy Cozad's deficiencies, inasmuch as neither reference teaches a transistor operable to generate heat above a selected threshold. Accordingly, claim 1, together with dependent claims 4, 5, and 16, is allowable over the cited art.

Claim 5 is patentable for reasons beyond the patentability of claim 1 since it teaches that the dielectric layer extends over the semiconductor wall portion, between the semiconductor material and the fluid, a topic on which all prior art is silent.

Claim 16 is patentable for reasons beyond the patentability of claim 1 since it recites "a dielectric layer extending over a first face of the semiconductor material with the fluid to be heated positioned adjacent to the dielectric layer on a side thereof opposite the transistor to receive the heat generated by the transistor." The prior art of record is silent on this topic, as well. The amendment to claim 16 is made to bring claim 16 into agreement with claim 1, following a previous amendment of claim 1.

Claims 24-26, 28-30, 34, 35, and 42-49 are rejected under 35 U.S.C. §103(a) as being unpatentable over Cozad in view of McSparran and further in view of Williams (U.S. Patent 5,243,212) and Jang et al. (U.S. Patent 6,624,065).

Cozad, McSparran, Williams, and Jang, even if combined, do not disclose, teach, or suggest the features of claim 24. Claim 24 recites, *intra alia*, "a channel region disposed in the semiconductor substrate between the source and drain regions to conduct electric current between the source and drain regions, the channel region having a resistance when conducting current to generate heat above a selected threshold...." For the reasons discussed above, Cozad and/or McSparran, fail to disclose, teach, or suggest a channel region disposed in a semiconductor substrate, and configured to generate heat. In particular, McSparran teaches a conventional resistive heating element controlled in a conventional and known way by a control device and a transistor. There is no teaching of a transistor having a channel region having a resistance to generate heat above a selected threshold. Further, neither Williams nor Jang

disclose, teach, or suggest the generation of heat by use of a channel region disposed in a semiconductor substrate. Williams and Jang appear to be nothing more than standard transistors in semiconductor substrates. Applicant admits that transistors of this type have been known for many years. These tend to show that the prior art teaches away from the invention. No one, prior to applicant's own disclosure, has either placed the transistor components of the channel, the source and the drain in the same substrate from which the heating chamber is formed, or employed the heating characteristics of the transistor to generate heat.

Claim 24 makes clear that the transistor is an MOS transistor; claim 1 covers either bipolar or MOS transistors. Accordingly, neither Cozad, McSparran, Williams, nor Jang, in any combination, disclose, teach, or suggest the features of claim 24. Thus claim 24 is allowable.

Cozad, McSparran, Williams, and Jang, even if combined, do not disclose, teach, or suggest the features of claim 44. Claim 44 recites, *intra alia*, "a channel region disposed in the semiconductor substrate between the source and drain regions to conduct electric current between the source and drain regions, the source, drain and channel regions producing heat when conducting current to generate heat above a selected threshold...." For the reasons discussed above, Cozad and/or McSparran, fail to disclose, teach, or suggest a source, drain or channel region disposed in a semiconductor substrate, and configured to generate heat. Further, neither Williams nor Jang disclose, teach, or suggest the generation of heat by use of a source, drain or channel region disposed in a semiconductor substrate. Accordingly, neither Cozad, McSparran, Williams, nor Jang, in any combination, disclose, teach, or suggest the features of claim 44. Thus claim 44 is allowable.

Conclusion

Overall, none of the references, singly or in any motivated combination, disclose, teach, or suggest what is recited in the independent claims. Thus, given the above amendments and accompanying remarks, the independent claims are now in condition for allowance. The dependent claims that depend directly or indirectly on these independent claims are likewise allowable.

Application No. 10/029,533
Reply to Office Action dated November 16, 2004


If there are any informalities or questions that can be addressed via telephone, the Examiner is requested to contact the undersigned representative at (206) 622-4900.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

SEED Intellectual Property Law Group PLLC



Harold H. Bennett II
Registration No. 52,404

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Enclosures:

Postcard

Extension of Time

701 Fifth Avenue, Suite 6300
Seattle, Washington 98104-7092
Phone: (206) 622-4900
Fax: (206) 682-6031

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